

Descriptive analysis of COVID-19 cases and deaths among traffic professionals in a Brazilian Amazon metropolis, between 2020 and 2021

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Received: 10 Jun 2022,

Received in revised form: 08 Jul 2022,

Accepted: 14 July 2022,

Available online: 24 July 2022

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Keywords— COVID-19, Coronavirus Infections, Sars-CoV-2, Epidemiology, Transport.

Abstract— The transport service was considered essential during the new coronavirus pandemic, leaving professionals exposed to contagion by the Sars-Cov-2 virus. Cases and deaths from COVID-19 reported in the state of Pará, Brazil, among professionals in the transit and transport sector were analyzed. A descriptive observational epidemiological study was carried out with official data from the Pará state health department, available from March 2020 to May 2021. The case fatality rate was estimated and a map of the spatial distribution of COVID-19 was produced. There were 3 028 cases and 63 deaths, of which 95% were male. Most cases were reported in the municipalities of Parauapebas, Belém and Marabá, respectively. Transport services have not completely stopped, leaving professionals vulnerable due to daily contact with users, needing to prioritize preventive measures against COVID-19 in the group.

I. INTRODUCTION

The World Health Organization (WHO) on March 11, 2020 declared the new coronavirus a pandemic due to the rapid spread of the Sars-CoV-2 virus around the world [1]. The first case of COVID-19 in the country was reported on the 26th. of February 2020, and in the state of Pará on March 18 of the same year, from then until the month of May 2021, 543 807 were counted, and of these, 15 186 died. Given this scenario, the North region, which is already marked by the vulnerability of social groups, was the most affected in the country, coming to be considered

the epicenter of the disease in the country, representing a challenge for public health [1].

In several cities, with the rapid spread of the disease, one of the first control measures taken was the suspension of some activities related to traffic and transport. In Pará, the population's mobility through transport services was compromised, especially during the first months of the pandemic, this sector with its app drivers, taxi drivers, motorcycle taxi drivers, complementary alternative transport and especially public transport continued to work, being considered one of the essential activities, even with the reduction in the supply of services due to decrees

that determined the restriction of the movement of people, in order to avoid agglomerations [2]. However, the most populous municipalities in the state felt the effects of the pandemic even more, registering cases and deaths by COVID-19 among transit and transportation professionals [3].

In Brazil, many people rely on public transport to get around on a daily basis. In 2020, a mapping was carried out by researchers from the Federal University of Rio de Janeiro in order to know the risk of contamination of the different classes of Brazilian workers by the new coronavirus related to their professional activities. It was observed that in the country, professionals who work in "transport" are part of a category with an infection risk index greater than 60% [4]. They are vulnerable even when wearing protective masks, due to daily contact with several people in vehicles, crowded, and it is not possible to adequately comply with the social distance of at least one meter, recommended by the competent health bodies.

Knowing the distribution of COVID-19 among these professionals is of great relevance to science and society in general, to better face the pandemic. In addition to the occurrence of underreporting, for an adequate monitoring of diseases and actions aimed at their prevention and control, it is important to complete the data in the notification form, generating reliable data that contribute to the characterization of the epidemiological profile of the population, as well as the elaboration of public policies aimed at collective health [5]. Thus, it is necessary to quantify the professionals who had contact with the virus, thus, taking into account the issues and problems presented, the objective of this study was to analyze confirmed cases and deaths by COVID-19 among transit and transport workers in the state of Pará, Brazil.

II. METHOD

A descriptive observational epidemiological study was carried out with a quantitative approach. The population of interest in the study were traffic and transport professionals who work in the state of Pará. Secondary data were extracted from the database of the COVID-19 monitoring system of the Secretary of Health of the State of Pará (SESPA), in May 2021.

The COVID-19 case definition criteria followed the clinical, clinical-epidemiological, clinical-imaging, laboratory, laboratory criteria mm asymptomatic individual, as established by SESPA.

The notifications of cases and deaths followed the criteria (clinical, clinical-epidemiological, clinical-imaging or clinical-laboratory) established by the Ministry of

Health. For the present study, the notifications registered according to the date were used, which were from March 1, 2020 to May 18, 2021, throughout the State of Pará, and those who belonged to the professional category of traffic worker were selected. and transport. Data collection took place on only one occasion, which was on May 18, 2021.

The epidemiological profile was analyzed according to the following variables: sex, age group, main comorbidities and the municipality in which the case was reported. The fatality rate of COVID-19 was determined by dividing the number of deaths by the number of diagnosed cases among the population studied and then multiplied by one hundred so that the value was expressed as a percentage.

The Geographic Information Systems (GIS) QGIS 3.10 was used to georeference the number of confirmed cases and deaths by COVID-19 by municipalities, generating a thematic map. To classify the cases among the professionals studied, the Jenks algorithm was used, which consists of minimizing the sums of variance within each class through the natural breaks method, so that there is no duplication of data for each municipality [6].

Data were tabulated in the Microsoft Excel 2019 program and the relative and absolute frequencies of the variables studied were calculated. The Chi-square test with a significance level of 5%, performed in the BioEstat 5.3 software, was used to verify differences between the calculated frequencies.

Taking into account resolution nº 466/2012, all ethical aspects in research with human beings were respected in this study. Due to the fact that it is an analysis of secondary data, without identifying the individuals, there was no need for submission to the CEP/CONEP system.

III. RESULTS

Of the 543 807 cases reported in the population by SESPA, in the period from March 1, 2020 to May 18, 2021, 3028 were registered as traffic and transport professionals, which represents 0.5% of the total cases in the State. Among the 15 186 deaths reported in the State in the same period, 63 deaths were from traffic and transportation professionals, representing 0.4% of the total number of deaths in the State. Considering the same period, the fatality rate by COVID-19 of the general population of the State of Pará and the national one was 2.8%, while for the category of traffic and transport professionals it was 2.1%.

Considering the total number of cases reported as traffic and transport professionals, the municipality with the highest number of reported cases was Parauapebas

(n=1,321), followed by Belém (n=274) and Marabá – (n=241). The cities with the highest number of deaths in this same professional group were Belém (n=32), Paragominas (n=3) and Tailandia (n=3) (Fig. 1).

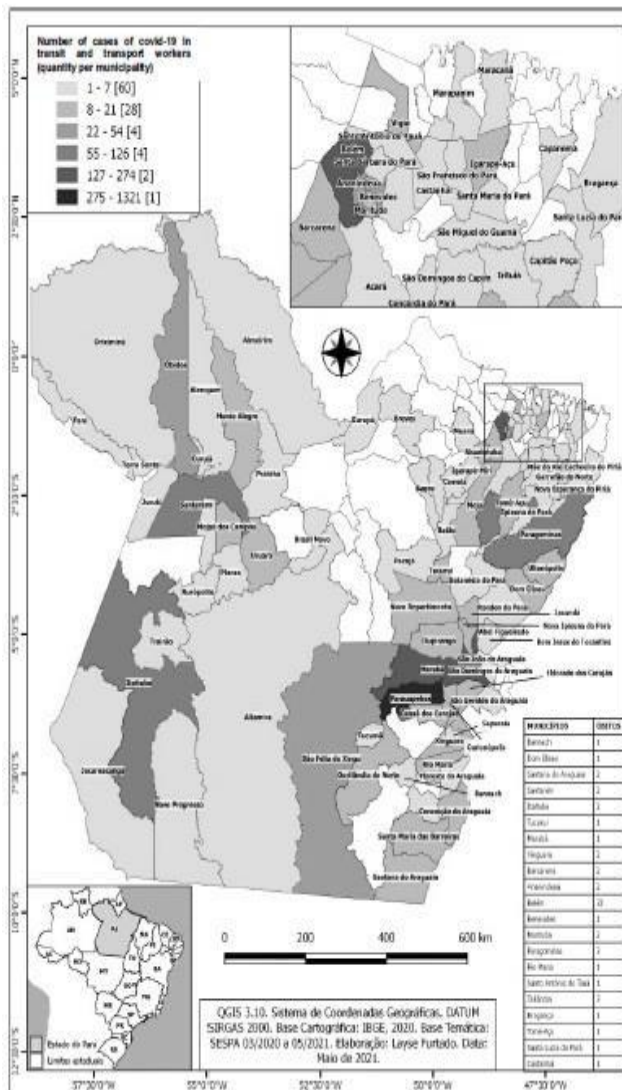


Fig. 1: Spatial distribution of cases and deaths by covid-19 classified as traffic and transport professionals in the state of Pará, notified between March 1, 2020 and May 18.

The study population is mostly male, representing 95% (n=2 875) of the cases.

The most affected age group was 30-39 years old, constituting 94.7% (n=1 041) in males and 5.3% (n=58) in females (Fig. 2).

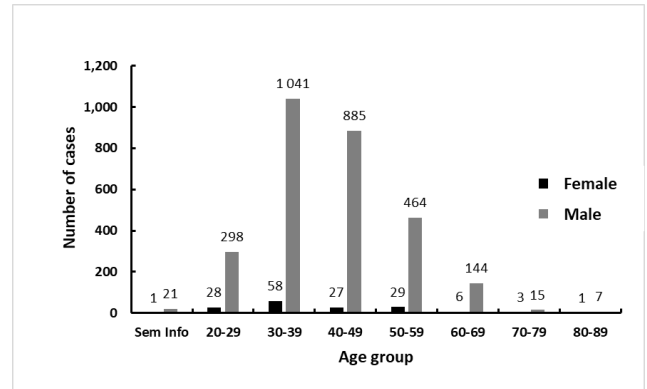


Fig. 2: Confirmed cases of COVID-19 among traffic and transport professionals according to sex and age group in the state of Pará, reported between March 1, 2020 and May 18, 2021.

Of the total number of deaths, 90.5% (n=57) occurred in males. Deaths were more frequent in the age group of 50-69 years (n=38) among men representing 60.30% of deaths, and in the age group of 70-79 years (n=3), among women with 4, 8% (Fig. 3).

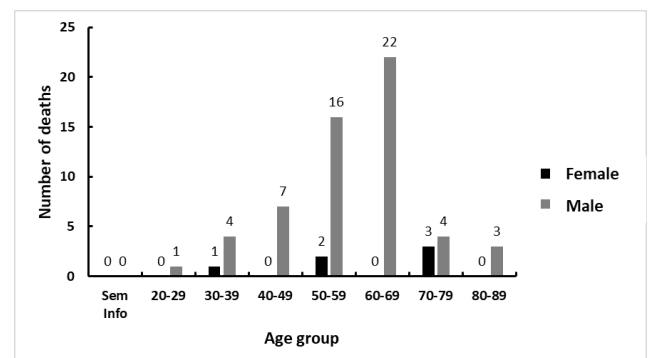


Fig. 3: Deaths from COVID-19 among traffic and transport professionals according to sex and age group in the state of Pará, from March 2020 to May 2021.

The chi-square test showed a significant difference between cases and deaths in the age groups (p-value <0.001). In the general total of cases, the most affected age group was 30-39 years old with 36.3% (n=1 099), followed by 40-49 years old with 29.9% (n=905). The test also showed a significant difference between cases and deaths in the registered comorbidities (p-value <0.002). The most frequent comorbidity among cases was heart disease, which occurred in 3.4% (n=104) of the total cases, of which 20.6% (n=13) died from COVID-19. Diabetes mellitus was recorded in 3.2% (n=99) of the total cases, of which 19% (n=12) died (Table 1).

Table.1: COVID-19 deaths by age group and comorbidities in traffic and transport professionals in the state of Pará, from March 2020 to May 2021.

	Deaths		Total		p-value
	No	Yes			
	n	(%)	n	(%)	
Age group					<0,0001*
No information	22	100	0	0	22
20-29	325	99,7	1	0,3	326
30-39	1 094	99,5	5	0,5	1 099
40-49	905	99,2	7	0,8	912
50-59	475	96,3	18	3,7	493
60-69	128	85,3	22	14,7	150
70-79	11	61,1	7	38,9	18
80-89	5	62,5	3	37,5	8
Comorbidities					<0,0002*
Diabetes	87	87,9	12	12,1	99
Immunodeficiency	4	80	1	20	5
Heart disease	91	87,5	13	12,5	104
Lung disease	7	70	3	30	10
Neurological disease	0	0	1	100	1
Kidney disease	0	0	2	100	2
Obesity	0	0	1	100	1

*Chi-Square Test

IV. DISCUSSION

The fatality rate for COVID-19 can be considered high when compared to the fatality rate for the H1N1 virus, which is around 0.02% [7]. Two factors that added together contribute to its increase, one of which is the underreporting of cases, which is high throughout the country, as a result of the difficulty in testing patients, which is generally carried out in the most severe cases, and the scarcity of material resources for testing, another factor is the precarious care and the difficulty of accessing public health services, which often does not supply the large number of serious cases, a fact that is not surprising since the poor infected by covid-19 are the ones who die the most in all countries. countries in the world [8, 9, 10]. This highlights the importance of notifications for effective epidemiological surveillance of COVID-19 throughout the country [11].

The municipality of Parauapebas, which belongs to the southeastern mesoregion of Pará, where the largest open-pit iron ore mine in the world is located, had the highest number of confirmed cases (n=1 321), representing 0.2% of the total cases. confirmed in the state. It was the first in the country to carry out mass testing in partnership with the city hall and the company Vale S.A., a factor that certainly contributed to the high confirmation of cases and to the decrease in the fatality rate of professionals compared to the rate of the general population. The strategy applied in the first months of the pandemic made it possible to trace the epidemiological profile of the

disease in the municipality and identify the most affected locations so that action could be taken to isolate those who tested positive, also minimizing cases of underreporting [12,13].

With mining activity considered essential, and maintained during the pandemic, with intense migratory flow in the region, Parauapebas saw COVID-19 cases jump, occupying the fourth place in the highest number of cases in the entire state, possibly due to the interaction population among the municipalities in the region and even people who come from outside the state, thus collaborating with the spread of the virus [14].

Belém, the capital of Pará, ranked second in the number of cases (n=274) representing 9% of cases in the population studied and 0.05% of cases in the general population of the state. The other municipalities that make up the metropolitan region together add up to 123 cases. In the metropolitan region before the COVID-19 pandemic, around 1 000 000 public transport users circulated daily [15], since many people work in the capital and live in the surrounding cities, contributing to a high traffic of people in the region. Taking into account the number of people who need to travel and for this they use public transport every day, it is natural that scenes of agglomeration at bus stops are common, increasing the risk of contagion by COVID-19 for both users and professionals working in the area. pandemic, this number of users was reduced during the periods of social isolation and lockdown enacted in the state [16].

The municipality of Marabá, in southeastern Pará, ranked third with 241 cases, representing 7.95% among the professionals studied and 0.04% among the cases of the general population of the state. It is the fourth most populous municipality in the state and is located near Parauapebas, for this reason the region's economic activities favor intercity displacement, a situation that can contribute to the spread of the virus in the region [17,18].

Humanity faced a great challenge with its reduced mobility during the pandemic, probably increasing the perception of risk of public transport. It was already expected that the municipalities indicated above would have a more expressive number of cases since they have a high population density. Local economic activities also contribute to greater mobility of the population through public transport, with inter-municipal displacements being characteristic. It is known that these professionals are more exposed and the means of public transport has possibly contributed to the contagion by COVID-19 [19].

According to a study carried out by the Pólis Institute in the city of São Paulo, which sought to identify the occupational activities of victims, using data on death by

COVID-19 from February 2020 to March 2021, the passenger transport sector is one of the most affected. by the pandemic, with 3.2% of the total deaths in the state. The authors also suggest that the proportion may be underestimated since the victim's occupation is rarely indicated in the notification or death certificate [20]. An observational study was carried out in 6 Asian countries: China, Japan, Singapore, Taiwan, Thailand and Vietnam, where the transmission of COVID-19 was linked to work, with cases reported between January 23, 2020 and March 14, 2020, with health professionals being the first category with the most risks, followed by drivers and workers in the traffic, pointing to the need to protect these workers by implementing specific control measures [21].

In the entire state, confirmed cases are predominant in females, representing 53% [22], while in the group studied, women represent only 5% of cases, which is probably related to the fact that the professions related to traffic and transportation are occupied mostly male [23]. According to the data presented, the age group most affected by COVID-19 was 30-39 years old in both sexes. It is important to note that this is the range in which the population is most economically active and needs to go out to work. This information is reinforced with the data found for the state of Pará and other Brazilian states [24, 25].

In the cases registered in the general population of Pará, although women represent the majority, it is men who most progress to the outcome of death in all age groups, with 59.1% mainly from 60 years old, indicating that there is an association between age and death, as has already been observed in the literature [22, 26]. One of the possible explanations may be related to the fact that the elderly develop comorbidities more frequently, making them more vulnerable to more severe forms of COVID-19 [27].

In this study, the age groups 50-59 and 60-69 were the ones with the highest number of deaths in the population studied (n=40), following the pattern observed throughout the country [22]. The literature indicates that men seek health services less when compared to women, but genetic and hormonal factors must also be taken into account, as well as a higher prevalence of chronic diseases [28].

In general, the cases of the studied population followed the same pattern found in the general population of the state of Pará, with cardiovascular diseases and diabetes mellitus being the most reported comorbidities. Such comorbidities are related to a greater possibility that the patient will need intensive medical care, aggravating the clinical process and can significantly affect the prognosis of COVID-19 [29,30].

V. CONCLUSION

The COVID-19 scenario in the state of Pará reached alarming numbers, a situation that reflected on professionals working in the transit and transport category, since the service was not interrupted during the pandemic, leaving them extremely vulnerable. A strong point of the study is to analyze the data on cases and deaths by covid-19 in a specific population, verify the association between deaths and comorbidities, in addition to the elapsed time of the data that comprise the first year of the pandemic. One of the limitations of the study is the incompleteness of the data provided by the Health Department, which can make it difficult to extrapolate the data to the entire state. The descriptive study is limited to describing the cases and deaths in the population of interest and, therefore, the representative sample is not random.

In general, the epidemiological profile of the studied group followed the profile observed in the national population. Traffic professionals have great social importance in the country, since they transport a significant part of the population that depends on these services daily, especially in large urban centers. In this way, it is recommended that the SUS give priority care to professionals who are symptomatic, reinforce the adoption of individual and collective prevention measures in the daily lives of professionals who are more vulnerable due to COVID-19, as well as encourage them to carry out the vaccination schedule. complete.

ACKNOWLEDGEMENTS

An acknowledgement section may be presented after the conclusion, if desired.

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